

PENDING CLAIMS

1-39. (canceled)

40. (previously amended) The vaccine of claim 41 comprising *P. haemolytica* ATCC 55518.

41. (previously amended) A vaccine for inducing protective immunity against *Pasteurella haemolytica* infection, comprising: an isolated *Pasteurella haemolytica* bacterium which comprises a mutation in an *aroA* gene, wherein the mutation attenuates the bacterium.

42. (previously added) The vaccine of claim 41 containing an adjuvant.

43. (previously amended) The vaccine of claim 41 which is formulated for a route of administration selected from the group consisting of intranasal, intratracheal, intramuscular, and intravenous routes of administration.

Fi 44. (previously amended) The vaccine of claim 41 which is formulated for subcutaneous injection.

45-47. (canceled)

48. (previously amended) A vaccine to induce protective immunity against *Pasteurella haemolytica* infection, comprising an isolated *Pasteurella haemolytica* bacterium which comprises a mutation in a leukotoxin B gene, wherein the mutation attenuates the bacterium.

49. (previously amended) A vaccine to induce protective immunity against *Pasteurella haemolytica* infection, comprising an isolated *Pasteurella haemolytica* bacterium which comprises a mutation in a leukotoxin D gene, wherein the mutation attenuates the bacterium.

50-56. (canceled)

57. (previously added) The vaccine of claim 48 which contains an adjuvant.

58. (previously added) The vaccine of claim 48 which is formulated for a route of administration selected from the group consisting of intranasal, intratracheal, intramuscular, and intravenous routes of administration.

59. (previously added) The vaccine of claim 48 which is formulated for subcutaneous injection.

60. (previously added) The vaccine of claim 49 which contains an adjuvant.

61. (previously added) The vaccine of claim 49 which is formulated for a route of administration selected from the group consisting of intranasal, intratracheal, intramuscular, and intravenous routes of administration.

62. (previously added) The vaccine of claim 49 which is formulated for subcutaneous injection.

63. (newly added) The vaccine of claim 48 wherein the mutation is a deletion mutation.

64. (newly added) The vaccine of claim 49 wherein the mutation is a deletion mutation.

65. (newly added) The vaccine of claim 63, wherein the deletion mutation is introduced into the leukotoxin B gene by a method comprising the steps of:

isolating a region of a *P. haemolytica* genome comprising the leukotoxin B gene;

introducing a deletion into the leukotoxin B gene to form a mutated DNA region comprising a mutated leukotoxin B gene;

introducing the mutated DNA region into *P. haemolytica* bacteria that do not express a *PhaI* restriction endonuclease to form transformants; and

screening the transformants to identify *P. haemolytica* bacteria whose chromosomal DNA contains the mutated leukotoxin B gene.

66. (newly added) The vaccine of claim 64, wherein the deletion mutation is introduced into the leukotoxin D gene by a method comprising the steps of:

isolating a region of a *P. haemolytica* genome comprising the leukotoxin D gene;

introducing a deletion into the leukotoxin D gene to form a mutated DNA region comprising a mutated leukotoxin D gene;

introducing the mutated DNA region into *P. haemolytica* bacteria that do not express a *PhaI* restriction endonuclease to form transformants; and

screening the transformants to identify *P. haemolytica* bacteria whose chromosomal DNA contains the mutated leukotoxin D gene.
